^f ii. *Influence of Water in Electro-chemical Decomposition*

208. It is the opinion of several philosophers, that the presence of water is essential in electro-chemical decomposition, and also for the evolution of electricity in the voltaic battery itself. As the decomposing cell is merely one of the cells of the battery, into which particular substances are introduced for the purpose of experiment, it is probable that what is an essential condition in the one case is more or less so in the other. The opinion, therefore, that water is necessary to decomposition, may have been founded on the statement made by Sir Humphry Davy, that " there are no fluids known, except such as contain water, which are capable of being made the medium of connection between the metals or metal of the voltaic apparatus: " * and again, " when any substance rendered fluid by heat, consisting of *water,* oxygen, and inflammable or metallic matter, is exposed to those wires, similar phenomena (of decomposition) occur." [2]

209. This opinion has, I think, been shown by other philosophers not to be accurate, though I do not know where to refer for a contradiction of it. Sir Humphry Davy himself said in i8oi,[3] that dry nitre, caustic potash and soda are conductors of galvanism when rendered fluid by a high degree of heat; but he must have considered them, or the nitre at least, as not suffering decomposition, for the statements above were made by him eleven years subsequently. In 1826 he also pointed out, that bodies not containing water, as *fused litharge* and *chlorate of -potassa,* were sufficient to form, with platina and zinc, powerful electromotive circles;[4] but he is here speaking of the *production* of electricity in the pile, and not of its effects when evolved; nor do his words at all imply that any correction of his former distinct statements relative to *decomposition* was required.

210. I may refer to the last part of these *Experimental Researches* (116, 138) as setting the matter at rest, by proving that there are hundreds of bodies equally influential with water in this respect; that amongst binary compounds, oxides,

chlorides, iodides, and even sulphurets (138) were effective; and that amongst more complicated compounds, cyanides and
salts, of equal efficacy, occurred in great numbers (138),

[1] *Elements of Chemical Philosophy,* p. 169, etc.
[2] *Ibid.* pp. 144, 145.
[8] *Journal of the Royal Institution,* 1802, p. 53.
* *Philosophical Transactions,* 1826, p. 406.